

**FINAL Programmatic Environmental Impact Statement
for Accomplishing Expanded Civilian Nuclear Energy
Research and Development and Isotope Production Missions in the
United States, Including the Role of the Fast Flux Test Facility**

Volume 2 Appendixes



Cover photograph and illustration identification, beginning at top center and going clockwise:

- Radioisotope tagged monoclonal antibodies, “smart bullets,” target malignant cells for diagnosis and treatment of diseases
- The Fast Flux Test Facility at the Hanford Site near Richland, Washington
- Illustration of a satellite that could use radioisotope power systems
- The High Flux Isotope Reactor at the Oak Ridge National Laboratory near Oak Ridge, Tennessee
- The Advanced Test Reactor at the Idaho National Engineering and Environmental Laboratory near Idaho Falls, Idaho
- Tip of a remote-handling arm, used for work in developing industrial and medical isotopes

AVAILABILITY OF THE FINAL NI PEIS

General questions regarding this PEIS or for a copy of this PEIS, please contact:

Colette E. Brown, Document Manager
Office of Space and Defense Power Systems (NE-50)
Office of Nuclear Energy, Science and Technology
U.S. Department of Energy
19901 Germantown Road
Germantown, MD 20874
Attention: NI PEIS
Telephone: (877) 562-4593
E-mail: Nuclear.Infrastructure-PEIS@hq.doe.gov

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Locations: Idaho, Tennessee, Washington

Contacts: For copies of this programmatic environmental impact statement (PEIS), call toll-free (877) 562-4593

For additional information on this Final PEIS, contact:

Colette E. Brown, Document Manager
Office of Space and Defense Power Systems (NE-50)
Office of Nuclear Energy, Science and Technology
U.S. Department of Energy
19901 Germantown Road
Germantown, MD 20874
Attention: NI PEIS
Telephone: (877) 562-4593

For general information on the DOE National Environmental Policy Act (NEPA) process, contact:

Carol M. Borgstrom, Director
Office of NEPA Policy and Compliance (EH-42)
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585
Telephone: (202) 586-4600, or leave a message at (800) 472-2756

Abstract: Under the authority of the Atomic Energy Act of 1954, as amended, the DOE is responsible for ensuring the availability of isotopes for medical, industrial and research applications, meeting the nuclear material needs of other Federal agencies, and undertaking research and development activities related to development of nuclear power for civilian use. To meet these responsibilities, DOE maintains nuclear infrastructure capabilities that support various missions. Current estimates for the future needs of medical and industrial isotopes, plutonium-238, and research requirements indicate that the current infrastructure may soon be insufficient to meet the projected demands. DOE proposes to enhance these capabilities to provide for: (1) production of isotopes for medical and industrial uses, (2) production of plutonium-238 for use in advanced radioisotope power systems for future National Aeronautics and Space Administration (NASA) space exploration missions, and (3) the Nation's nuclear research and development needs for civilian application.

This NI PEIS evaluates the environmental impacts of a No Action Alternative (maintaining status quo), four alternative strategies to accomplish this mission, and an alternative to permanently deactivate the Fast Flux Test Facility (FFTF), with no new missions. Alternatives 2, 3, and 4 also include permanent deactivation of FFTF. The alternatives are:

No Action

1. Restart FFTF at Hanford, Washington
2. Use only existing operational facilities
3. Construct one or two new accelerators
4. Construct a new research reactor
5. Permanently deactivate FFTF (with no new missions)

The Preferred Alternative is Alternative 2, Option 7, Use Only Existing Operational Facilities. DOE would reestablish domestic production of plutonium-238, as needed, using the Advanced Test Reactor in Idaho and the High Flux Isotope Reactor in Tennessee, and would process irradiated plutonium-238 targets at the Radiochemical Engineering Development Center in Tennessee. DOE would permanently deactivate FFTF under the Preferred Alternative.

Public Comments: The Draft NI PEIS was issued for public review and comment on July 21, 2000. The comment period ended on September 18, 2000, although late comments were considered to the extent practicable. Public hearings were held to obtain comments on the Draft NI PEIS in Oak Ridge, Tennessee; Idaho Falls, Idaho; Hood River and Portland, Oregon; Seattle and Richland, Washington; and Arlington, Virginia. All comments were considered by DOE in preparing the Final NI PEIS, which also incorporates any new information received since issuance of the Draft NI PEIS. In response to comments on the Draft NI PEIS and as a result of information that was unavailable at the time of the issuance of the Draft PEIS, the Final PEIS contains revisions and new information, indicated by a sidebar in the margin. Volume 3 contains the comments received during the public review period for the Draft NI PEIS and DOE's responses to these comments. DOE will use the analyses presented in the Final NI PEIS as well as other information, including public input, costs, nonproliferation impacts, schedules, technical assurance, and other policy and programmatic objectives, in preparing the Record of Decision for accomplishing expanded civilian nuclear energy research and development and isotope production missions in the United States, including the role of FFTF. DOE will issue the Record of Decision no sooner than 30 days after the U.S. Environmental Protection Agency publishes a notice of availability of the Final NI PEIS in the Federal Register.

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List of Acronyms

AAA	Advanced Accelerator Applications
ALARA	as low as is reasonably achievable
ALOHA	Area Locations of Hazardous Atmospheres
ATR	Advanced Test Reactor
ATW	Accelerator Transmutation of Waste
BEIR	Biological Effects of Ionizing Radiation
BLIP	Brookhaven LINAC Isotope Producer
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLWR	commercial light water reactor
CPP-651	Chemical Processing Plant 651 (Building CPP-651)
dBA	decibels A-weighted
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FDPF	Fluorinel Dissolution Process Facility
FFTF	Fast Flux Test Facility
FMEF	Fuels and Materials Examination Facility
FONSI	Finding of No Significant Impact
FPF	Fuel Processing Facility
FR	Federal Register
g	gravitational acceleration
Hanford	Hanford Site
HB	horizontal beam
HEPA	high-efficiency particulate air (filter)
HFIR	High Flux Isotope Reactor
HVAC	heating, ventilating, and air conditioning
I ⁴	International Isotopes Idaho, Inc.
IAEA	International Atomic Energy Agency
IEM	Interim Examination and Maintenance Cell
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
IPF	Isotope Production Facility
ISC3	Industrial Source Complex
ISCST3	Industrial Source Complex (short-term model)
LANL	Los Alamos National Laboratory
LANSCE	Los Alamos Neutron Science Center
LCF	latent cancer fatality
LINAC	linear accelerator
MASF	Maintenance and Storage Facility
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NEPO	Nuclear Energy Plant Optimization

NERAC	Nuclear Energy Research Advisory Committee
NERI	Nuclear Energy Research Initiative
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NI PEIS	<i>Final Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States, Including the Role of the Fast Flux Test Facility</i>
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
PCAST	President's Committee of Advisors on Science and Technology
PEIS	programmatic environmental impact statement
P.L.	Public Law
PM _{2.5}	particulate matter with an aerodynamic diameter less than or equal 2.5 microns
PM ₁₀	particulate matter with an aerodynamic diameter less than or equal to 10 microns
PNNL	Pacific Northwest National Laboratory
RCRA	Resource Conservation and Recovery Act
REDC	Radiochemical Engineering Development Center
RPL	Radiochemical Processing Laboratory
SNL	Sandia National Laboratories
SRPS	Stirling radioisotope power systems
SRS	Savannah River Site
SRTG	Small Radioisotope Thermoelectric Generator
SST/SGT	safe, secure trailer/SafeGuards Transport
TEDF	Treated Effluent Disposal Facility
TRIGA	training, research, isotopes General Atomics (reactor)
UZrH	uranium-zirconium-hydride
U.S.C.	United States Code
USGS	U.S. Geological Survey
WAG	waste area grouping
WIPP	Waste Isolation Pilot Plant
Y-12	Y-12 Plant